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February 29, 2000

Mr. Vernon A. Williams, Secretary
Surface Transportation Board
Office of the Secretary
Case Control Unit
Attn: STB Ex Parte No. 582
1925 K Street, N.W.
Washington, DC 20423-0001

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Re: Public Views on Major Rail Consolidations (STB Ex Parte No. 582)

Dear Secretary Williams:

Enclosed, in accordance with the decision served in this proceeding on February 17, 2000, are an original and 10 copies of the prepared text of my statement in this proceeding, together with a diskette containing that text in WordPerfect 7 format.

Respectfully submitted,

Christopher A. Velturo

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Enclosures

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BEFORE THE SURFACE TRANSPORTATION BOARD

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STB EX PARTE NO. 582

PUBLIC VIEWS ON MAJOR RAIL CONSOLIDATIONS

WRITTEN STATEMENT OF CHRISTOPHER VELLTURO

FEBRUARY 29, 2000



I. QUALIFICATIONS AND OVERVIEW OF TESTIMONY

I am a Senior Vice-President at National Economic Research Associates, Inc., in Cambridge, Massachusetts. I received a Bachelor of Science degree (*cum laude*) in applied mathematics and economics from Brown University in Providence, Rhode Island, and a Doctor of Philosophy (Ph.D.) degree in economics from the Massachusetts Institute of Technology (MIT) in Cambridge. While at MIT, I specialized in industrial organization and econometrics, and completed my dissertation in 1989 under the direction of Professor Ann F. Friedlaender. I was awarded Bradley Fellowships in public economics during my tenure at MIT. I have also completed extensive training in public economics. My curriculum vitae is attached as Exhibit 1.

I have studied structural, regulatory, and competitive issues relating to the rail industry for more than fifteen years. I have published several papers in academic journals relating to regulatory and competitive determinants of rail efficiency and viability.¹ This body of research focused significantly (though not exclusively) on rail consolidation and rail regulatory reform. I continue to conduct research on transportation issues generally, and rail issues in particular. I have recently assessed structural and competitive issues relating to the assimilation of Conrail into CSX and Norfolk Southern, and relating to Canadian National's acquisition of the Illinois Central railroad, both before the Surface Transportation Board.

I have extensive antitrust expertise and experience with respect, in particular, to the competitive ramifications of mergers and acquisitions. In the past seven years, I have conducted competitive analyses for over 100 transactions. This work has spanned a broad array of industries, including: grains and agricultural products, sugar, salt, fertilizers, chemicals, forestry products, municipal waste, medical products and services, software,

¹ "Cost Effects of Mergers and Deregulation in the U.S. Rail Industry" (with Berndt et al.) in *Productivity Issues in Services at the Micro Level*, ed. Zvi Griliches and Jacques Mairesse, Kluwer Academic Publishers, 1993; "Cost Effects of Mergers and Deregulation in the U.S. Rail Industry" (with Berndt et al.), *Journal of Productivity Analysis*, 4, 127-144, 1993; "Rail Costs and Capital Adjustments in a Quasi-Regulated Environment" (with Friedlaender et al.), *Journal of Transport Economics and Policy*, 131-152, May 1993; "Deregulation, Mergers and Cost Savings in Class I U.S. Railroads, 1974-1986" (with Berndt et al.), *Journal of Economics and Management Strategy*, Vol. 1, No. 2, 1992.

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electronic funds transfer networks, and many others. I have presented my work before the United States Department of Justice (Antitrust Division), the Federal Trade Commission, the European Commission, the Canadian Competition Bureau, the Federal Reserve, the Surface Transportation Board, and various state Attorneys General. My experience in many of these projects bears directly on the conclusions I have reached with respect to the general policy questions and specific combination-related issues currently under consideration by the Board.

I have been asked by the Canadian National Railway Company ("CN"²) to express my views on recent trends in railroad system reconfiguration in North America and the role the proposed transaction between CN and BNSF³ may have in determining the course of future reconfigurations. With respect to recent trends in rail reconfiguration, I find:

- Recent rail consolidations have generated significant economies and efficiencies that have reduced railroad costs and enhanced railroad viability;
- Shippers have benefited from these efficiencies directly through enhanced service quality and lower prices;
- Critically, shippers have utilized a stronger rail system to compete effectively against, and differentiate their products from, overseas imported goods throughout North America.

With respect to the impact that the proposed combination of BNSF and CN may have on the future of the North American rail industry, I find:

- If approved, the proposed transaction is unlikely to precipitate reactions by other industry participants *unless* such participants are facing enhanced competition from the combined entity compared to the competition they would face absent the transaction. This enhanced competition would benefit shippers.
- The costs of regulatory delay — postponing (and, potentially, foregoing) the substantial efficiencies and economies and concomitant benefits for shippers — of

² "CN" refers to the Canadian National Railway Company, along with the Grand Trunk Corporation and Grand Trunk Western Railroad Incorporated (collectively, "GTW"), the Illinois Central Corporation and Illinois Central Railroad Corporation (collectively, "IC"), the Chicago Central & Pacific Railroad Company, and the Cedar River Railroad Company.

³ "BNSF" refers to the Burlington Northern and Santa Fe Corporation, along with the Burlington Northern and Santa Fe Railway Company.

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the proposed transaction appear considerably more certain and significant than any hypothetical benefit of regulatory delay.

The remainder of this paper provides the economic foundation and analyses that underlie my findings.

II. RECENT AND CURRENT TRENDS IN RAIL RECONFIGURATION HAVE INCREASED EFFICIENCY AND SOCIAL WELFARE

A. Enhanced Rail Efficiency and Viability

Since the passage of the Staggers Act in 1980, the railroad freight industry has changed dramatically in North America. In 1976, there were fifty-two Class I railroads in the United States — with 185,000 miles of road.⁴ By 1988, eighteen Class I railroads remained, with only 128,000 miles of road owned and \$23.5 billion (1998 dollars) in rolling stock. At present, five U.S. Class I railroads⁵ remain along with Canadian National's U.S. presence (the GTW and IC) and Canadian Pacific's U.S. presence. In 1998, these railroads owned only 101,000 miles of road, 21 percent less than what was owned in 1988, and 45 percent less than what was owned in 1978.

These structural changes have dramatically enhanced the competitiveness of rail transportation. While the number of firms participating in the industry and the amount of road owned by these firms have shrunk significantly, output has soared. Revenue ton-miles of freight handled by Class I railroads in 1978 totaled 858 billion. By 1988, they had leapt 16 percent to 996 billion. By 1998, Class I rail freight rose to 1.4 trillion revenue ton-miles, an increase of 41 percent from 1988. Real U.S. industrial output increased by only 36 percent during the same period.

⁴ In 1991, the definition of Class I railroads changed to \$250 million or more in annual revenue.

⁵ The U.S. Class I roads are BNSF, Union Pacific, Norfolk Southern, CSX, and Kansas City Southern.

1. Efficiency Realization

Underlying these impressive gains in output and reductions in capital employed, not surprisingly, are dramatic efficiency realizations. The efficiency gains realized during the first decade after the passage of the Staggers Act have been maintained, and in many cases have been exceeded, by those realized in the last decade. Freight density (thousands of gross ton-miles of freight per mile of road owned) increased from 15,068 to 23,869 between 1988 and 1998, a gain of 58 percent. Average length of haul⁶ increased by 20 percent, from 697 miles in 1988 to 835 miles in 1998. Gross ton-miles per locomotive mile (a reflection of the frequency of use of large unit trains) increased from 1,629 in 1988 to 1,986 in 1998 (an increase of 22 percent). These dramatic efficiency improvements, and the concomitant cost reductions, benefited shippers and improved the financial viability of roads.

2. Viability Enhancement

The efficiencies and economies achieved by the roads, particularly during the latest reconfigurations, have improved the financial health of railroads. The U.S. General Accounting Office⁷ ("GAO") found that returns on investment and returns on equity were 61 and 24 percent higher, respectively, from 1990 to 1997 than comparable returns during the 1980s. Railroad operating ratios also improved during the 1990s. Improved financial health has increased railroads' ability to attract capital. Increased access to capital has enabled the roads to undertake significant new investments, including reconfigurations, to achieve additional operating efficiencies and economies, and to improve service. However, while financial health has improved, most railroads still do not earn the industry cost of capital.

B. Benefits to Customers

Rail shippers have benefited directly and indirectly as a result of recent efforts to continue the reconfiguration of the North American rail network. While rail freight volumes have increased 38 percent since 1988, rail freight *revenues* have increased only 19 percent.

⁶ Average length of haul is defined as total revenue ton-miles of freight divided by revenue tons of freight.

⁷ United States General Accounting Office (1999), *Railroad Regulation: Changes in Railroad Rates and Service Quality Since 1990*, GAO/RECD-99-93 at <http://www.gao.gov/AIndexFY99/abstracts/rc99093.htm>.

This implies that average rail freight prices have declined considerably since 1988. Indeed, rail transport statistics indicate that the average freight revenue per ton-mile in the U.S. fell from 2.79 cents in 1988 to 2.40 cents in 1998.⁸

As noted earlier, industrial goods producers have expanded significantly their demand for rail transportation beyond the expansion observed in their production levels. Under the economic laws of revealed preference, such increases indicate that shippers have benefited by expanding their use of rail over other mode choices.⁹ Naturally, some of this increased usage has been generated by lower freight prices. However, data indicate that service quality has also been enhanced. Transit times have fallen significantly since 1988, as demonstrated, for example, by sharp reductions in yard switching hours relative to train hours. In 1988, yard switching hours per road train hours stood at 0.71. By 1998, it had fallen by more than 35 percent to 0.45.

It is obvious that access to lower cost and higher quality rail service directly benefits North American industrial producers through concomitant cost savings. However, an efficient rail network also provides a critical, though *indirect*, benefit to North American industrial producers. A more efficient rail network expands the geographic range that a producer can serve from a single industrial plant. For example, a sugar refinery that originally faced a 500-mile effective competitive limit on its rail-shipped products could effectively reach 600 or perhaps 700 miles out from the plant under an improved rail network. Given the expanded service area that a single plant could reach, North American sugar producers (and North American industrial producers generally) would be able to build, reconfigure, and expand their industrial sites to a significantly greater scale, thus achieving greater cost savings and utilizing

⁸ GAO also concluded that real rail rates fell since the passage of the Staggers Act until 1997. (*Ibid.*)

⁹ The laws of revealed preference were originally postulated by Paul Samuelson in the early 1930s. Under revealed preference, individual economic actors reveal they are made better off (from a welfare perspective) under choice *A* versus choice *B* when they are observed to select *A* over *B* when both are available.

their greater scale and demand base to invest in incremental research and product development efforts.¹⁰

My extensive experience in merger analyses has included many recent transactions involving North American industrial producers. The expanded range that a more efficient rail system has afforded these producers has had real effects on firm efficiency and on competition for these products. For example, the use of unit trains and enhanced rail service quality have been important factors in the increased productivity and competitiveness in many industries, including: fertilizer, sugar, industrial lime, salt, agricultural products, and forestry/paper products, just to name a few.

The availability of an efficient rail network to North American producers has taken on an added importance with the increase in economic globalization. Industrial producers in North America currently face strong competition within North America from imported sources and strong competition abroad for export sales. International competition has grown significantly in recent years and, with continued trade liberalization, it is expected to intensify in the near future. The *Economic Report of the President 2000* concluded that the "U.S. economy today is more closely integrated with the rest of the world than at any time in history," citing the rise of exports and imports to nearly 25 percent of U.S. GNP and the fall of U.S. tariff rates on imports to their lowest level.¹¹ According to Dr. Joseph Stiglitz, former Chairman of the President's Council of Economic Advisers, recent years "have probably seen the most important breakthroughs in opening up markets since the establishment of GATT in the aftermath of World War II," including the end of the Cold War; NAFTA; the completion of the Uruguay Round in 1994 which brought agriculture, textiles and clothing more fully into GATT; the new APEC¹² and FTAA;¹³ and the rise of the East and Southeast Asian economies.¹⁴ The U.S. is

¹⁰ A more efficient rail network also expands the extent and number of multi-plant configurations (for example, component manufacture in the U.S. with assembly in Mexico) that North American producers can employ to achieve efficient production.

¹¹ President's Council of Economic Advisors, *Economic Report of the President 2000*, Government Printing Office at http://www.access.gpo.gov/su_docs/aces/aaces002.html.

¹² APEC is the Asia-Pacific Economic Cooperation group established in 1989, the primary regional vehicle for promoting open trade and economic cooperation.

seeking additional market access in agricultural and industrial products in negotiations beginning this year in order to compete better in overseas markets where, for example, average prices of food and related products are 34 percent higher in the European Union and 134 percent higher in Japan than in the U.S.¹⁵

Exhibit 2 provides import statistics from the U.S. Bureau of Commerce on several commodities for which rail transportation is central to U.S.-based production.¹⁶ The dramatic increase in competition from outside of North America is evident. Chemicals and allied products imported from outside North America into the U.S. rose 140 percent (Custom Value) between 1992 and 1999. Non-metallic mineral imports from outside North America increased 244 percent. Paper and allied products imports and lumber products imports from outside North America increased 103 and 126 percent, respectively, from 1992 to 1999. Primary metal products imported from outside North America increased 93 percent over the same period.

A more efficient and competitive North American rail system will help North American industries compete against imports from outside North America in three important ways.¹⁷ First, an efficient rail network can provide lower-cost transportation services, thereby enabling North American producers to be more price-competitive with imports which frequently benefit from relatively lower input costs in Asia and elsewhere.

Second, an efficient network expands the reach of North American producers' plants. These producers can thus serve a broader geographic market and invest in larger facilities and

¹³ FTAA is the Free Trade Area of the Americas established to integrate the economies of the Western Hemisphere into a single free trade arrangement.

¹⁴ Dr. Joseph E. Stiglitz, Chairman of the President's Council of Economic Advisors, "Written Testimony for the Joint Economic Committee of Congress," February 14, 1997.

¹⁵ President's Council of Economic Advisors, *Economic Report of the President 2000*, Government Printing Office at http://www.access.gpo.gov/su_docs/aces/aces002.html.

¹⁶ The import statistics are reported in nominal dollars; use of a deflator for import statistics in real dollars yields comparable results.

¹⁷ Of course, importers to North America also benefit from improved rail transportation, but the benefits to North American producers are relatively larger. For example, rail is a larger portion of the transportation bill for products from North American producers. And, many of the primary North American population centers are located close to waterborne deliveries of transoceanic imports while many midcontinent (including Midwest) producers use rail for access to these markets.

more efficient multi-plant operations, achieving significant economies of scale and scope. For example, U.S. producers import and export within many of the same trade categories. This two-way trade is a result, in part, of the division and reallocation of production processes in which discrete elements of production, such as research and development, design, assembly, and packaging, are performed by firms based on countries' comparative advantages in different tasks. This is reflected in trade statistics in which 40 percent of U.S. imports and 63 percent of U.S. exports are a result of trade from the operations of U.S. multinational corporations, of which over 40 percent are from intracorporation trade between U.S. parents and international affiliates of multinational corporations.¹⁸ An efficient North American rail system reduces the costs of intermediate transportation and expands the set of possible configurations of production which, in turn, affect producers' decisions whether to locate components of their production in North America or overseas.

Finally, an efficient North American rail network enables North American producers to differentiate their products from international competition. In industrial products, firms often seek to differentiate their products through enhanced customer service. This is frequently achieved through reduced delivery time and/or highly reliable and consistent deliveries. Often, such product differentiation affords North American industrial firms with the only viable means through which to compete with low-cost imported products that are viewed as undifferentiated "commodities". An efficient rail network is often an essential component of such a differentiation strategy.

Given the speed with which trade liberalization is taking place, North American industrial producers need to respond quickly to increasing competition from imports. In this context, any significant regulatory delay of an efficient reconfiguration of North America's rail network could leave North American industrial producers at a significant competitive disadvantage during a critical period. This disadvantage could jeopardize the viability of these North American industries, or require them to shift more of their production processes offshore in an effort to remain competitive with imported sources.

¹⁸ President's Council of Economic Advisors, *Economic Report of the President 2000*, Government Printing Office at http://www.access.gpo.gov/su_docs/aces/aaces002.html.

III. THE PROPOSED COMBINATION OF BNSF AND CN WILL NOT FORCE RAIL RECONFIGURATION DOWN A SOCIALLY INEFFICIENT PATH

I understand that the Board is considering the effect that the proposed transaction between BNSF and CN (and its timing) could have on the future structure and efficiency of the North American rail freight system. With respect to the combination itself, I find that any strategic response that is indeed undertaken by other railroads would be prompted by *pro-competitive* industry developments.

With respect to the timing of the proposed transaction, the impact of a significant regulatory delay in permitting the proposed transaction on rail efficiency can best be understood in a cost-benefit framework. In theory, delay may allow uncertainty to be resolved that could lead to more efficient outcomes; the likelihood and magnitude of such benefits depend on the degree of uncertainty that will be resolved and the strategic importance of the information that is determined with greater precision. On the cost side, delay places constraints upon economic actors that may lead to inefficient short run and/or long run outcomes. In the present case, the potential for benefits from regulatory delay appears highly speculative, while the costs of regulatory delay appear considerably more certain, significant, and imminent.

A. Future Consolidation Possibilities

The proposed transaction between BNSF and CN is alleged by some to represent a “tripping device” that will rapidly and inexorably lead the North American rail industry toward final consolidation. Furthermore, these observers appear to believe that this consolidation will be forced to proceed at a pace that will create significant logistical and managerial problems at the railroads, which in turn will generate significant shipper harm. A careful review of the economic and strategic options and likely responses of railroads does not support this view.

The characterization of the proposed BNSF-CN combination as a tripping device that will usher in ineffective consolidation fails any basic test of economic logic. The BNSF-CN combination will accelerate further consolidation only if rivals believe it is in their profit

maximizing interest to consolidate. That is, they will combine only if these firms believe they will lose significant business to the combined BNSF and CN if they do not. This can happen only if the BNSF-CN combination is effectively implemented and generates higher quality service and enhanced product offerings for shippers than the firms would have generated absent the combination. Thus, the proposed combination can only precipitate further industry consolidation if the BNSF-CN combination generates significant increases in shipper welfare. Even then, it would remain to be seen whether consolidation would necessarily be the competitive response, or whether the other railroads would find it in their interest to respond to the competitive challenge in other ways. Whatever the particular forms of response, however, an increase in competition will of course increase efficiency, not decrease it.

A number of parties, however, have hypothesized a scenario in which there will be a next round of consolidation that will be ineffectively undertaken and lead to service quality and delivery problems during the implementation phase for North American shippers using the newly combined roads. CN and BNSF have stated their intention to demonstrate in the control proceeding before the Board that they will successfully implement their transaction without service disruptions. In any event, under this hypothetical scenario, the profit maximizing response for any railroad that believes this hypothetical and has yet to align would be to *delay* consolidation and take advantage of the enhanced volume opportunities afforded by the failings of its newly combined rail rivals. Accordingly, railroads that believe the proposed BNSF-CN transaction (and their own potential transactions) will be poorly implemented will be *more* likely to move *more slowly* to consolidate than if the BNSF-CN combination had not taken place, since the implementation transition period will afford other roads opportunities to gain significant volumes at the combined firm's expense.

This economic logic would apply to all subsequent transactions. If at any stage, implementation problems beset a completed combination, firms contemplating the next consolidation (and anticipating implementation problems of their own) would not do so; rather, they would take advantage of the implementation problems facing the recently combined firms on a nonconsolidated basis. Only if the previous combination created a *more effective* rival (that is, one that offers enhanced products to shippers) would further consolidation take place.

B. Timing of Future Consolidation

Regardless of whether the BNSF-CN transaction presents an initial step toward a less efficient or more efficient North American rail system, some have questioned the combination's timing from a policy standpoint. Clearly, the timing appears optimal for BNSF and CN since, as rational economic actors, their stated intention represents for them the most timely framework within which to execute such a structural change. Thus, the timing issue must somehow adversely affect other railroads. Indeed, other roads have intimated that they are not prepared to step forward into another round of integration, given the lingering service and coordination problems from prior transactions. A delay would, the argument goes, enable these firms to sort out their lingering problems before moving on to strategic actions.

What is unclear throughout this argument is how the combination of two other railroads under the proposed timetable *changes* the incentives for other railroads in the direction of accelerating their strategic decision-making processes. As noted earlier, if the BNSF-CN combination suffers from coordination problems then the other railroads would be ideally situated in their current configurations to take business away from the troubled BNSF-CN (especially if they are not in the throes of their own coordination problems). Such BNSF-CN coordination problems only extend the time that these other roads have to consider their alternatives.

If, however, the proposed BNSF-CN combination is successfully implemented then this transaction may indeed put pressure on the other roads to improve their systems, perhaps through consolidation. But this is what competition is all about; one firm improves its product offerings to consumers and its rivals must respond in a pro-competitive manner or suffer from reduced profitability. From a policy perspective, this outcome is to be encouraged, not discouraged.

Moreover, the potential cost of such a regulatory delay to shippers may consist of more than the cost from the delay in enjoying enhanced rail services. As noted in the previous section, many North American industrial producers are facing severe and rapidly intensifying competition from international sources. Thus, while a delay might confer "benefits" that are

uncertain in both their existence and magnitude, the delay would induce costs that appear to be highly likely and substantial. These costs may also extend well into the future, as North American producers send more production offshore or lose their competitive position. On balance, delaying the proposed transaction offers questionable benefits of a highly speculative nature, while the costs of regulatory delay appear to be considerably more significant, certain and imminent.

IV. CONCLUSION

The North American economy is currently experiencing a period of unprecedented growth and technological change. At the same time, the accelerated pace of economic globalization means that North American industrial firms must embrace and leverage technological change to compete better in both North American and international markets. Recent enhancements in the quality of the North American railroad infrastructure have been an important contributor to North American industrial producers' ability to respond to these rapidly intensifying competitive challenges. Continued rail system optimization unhindered by regulatory delay will be an important contributor to the future viability and success of these producers. In this context, the proposed combination of BNSF and CN, if approved, would not cause North American railroads to undertake inefficient consolidation or inefficiently hasten consolidation.

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Dr. Vellturo received a Sc.B. degree in Applied Mathematics/Economics *magna cum laude* from Brown University in Providence, Rhode Island. He earned a Ph.D. in Economics at Massachusetts Institute of Technology (MIT), specializing in Industrial Organization and Econometrics.

Since completing his degree, Dr. Vellturo has performed economic analysis and provided expert testimony in the context of mergers and acquisitions, antitrust litigation, intellectual property litigation, and other matters. He has provided economic analysis in over seventy-five mergers and acquisitions spanning a broad array of industries. He has appeared before the U.S. Department of Justice, the Federal Trade Commission, various states' Attorneys General offices, the Federal Reserve Bank Board of Governors, and various Federal Reserve Banks on merger-related issues. He has also appeared at hearings before the European Commission. Dr. Vellturo has performed economic analysis relating to litigation matters in more than twenty-five antitrust actions and more than one hundred intellectual property actions. He has testified in U.S. District Court and before the American Arbitration Association.

Dr. Vellturo has published on issues relating to merger and acquisition related efficiencies, price discrimination, and market definition, among other topics. His writings have appeared in *Antitrust*, the *Antitrust Law Journal*, the *Journal of Economics and Management Strategy*, and the *Journal of Productivity Analysis*, among others.

EDUCATION:

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Ph.D., Economics, 1989

Primary Fields: Econometrics, Industrial Organization
Secondary Fields: Public Finance, Game Theory, Law and Economics

BROWN UNIVERSITY
Sc.B., Applied Mathematics and Economics (*magna cum laude*), 1983

EMPLOYMENT:

- 1999-Present NATIONAL ECONOMIC RESEARCH ASSOCIATES, INC.
Senior Vice President. Direct research and provide expert testimony on a variety of microeconomic issues with particular emphasis on antitrust, intellectual property, and mergers and acquisitions. Expert reports and testimony presented in U.S. District Court. Presented antitrust economic analyses to Federal Trade Commission, U.S. Department of Justice, Federal Reserve Bank Board of Governors and the European Commission.
- 1996-1999 NATIONAL ECONOMIC RESEARCH ASSOCIATES, INC.
Vice President.
- 1991-1996 CAMBRIDGE ECONOMICS, INC.
Director. Directed research and provided expert testimony on a variety of microeconomic issues with particular emphasis on antitrust, intellectual property, and mergers and acquisitions. Prior expert testimony provided in U.S. District Court and before the American Arbitration Association. Presented antitrust economic analyses to U.S. Department of Justice, Federal Trade Commission (Antitrust Division), state Attorneys General offices, and the Federal Reserve Bank Board of Governors.
- 1989-1991 NATIONAL ECONOMIC RESEARCH ASSOCIATES, INC.
Senior Consultant. Directed and performed research relating to issues of antitrust, intellectual property, mergers and regulation.
- 1987 DEPARTMENT OF ECONOMICS, M.I.T.
Teaching Assistant. Undergraduate econometrics.
- 1985-89 DEAN ANN F. FRIEDLAENDER, M.I.T.
Research Associate. Participated in research relating to transportation pricing and capital allocation responses to regulatory changes.
- 1983-85 NATIONAL ECONOMIC RESEARCH ASSOCIATES, INC.
Research Associate. Conducted research on a wide variety of issues including antitrust, railroad rate setting, optimal landfill pricing, and PCB and asbestos abatement strategies.

AWARDS AND PROFESSIONAL ACTIVITIES:

- Recipient, Bradley Fellowship in Public Economics, 1987 and 1988-89
- M.I.T. Departmental Fellowship, 1986
- Phi Beta Kappa, Brown University, 1983
- Sigma Xi, Brown University, 1983

Journal Referee for *American Economic Review* and *Rand Journal of Economics*

Member, American Economic Association

PAPERS/PUBLICATIONS/REPORTS/PRESENTATIONS:

"What Drives Consolidation?" Presented at the 28th Semiannual Members Meeting MIT/CRE, Cambridge, MA, May 14, 1998.

"Proving Unilateral Effects and Efficiencies in Merger Cases: A Demonstration." Presented at the 46th Annual ABA Antitrust Meeting, Washington, DC, April 1, 1998.

"Creating An Effective Diversion: Evaluating Mergers With Differentiated Products," Antitrust, Spring 1997.

"Economic Battles in the Antitrust Wars: Network Industries and Their Relevance to Antitrust in the Computer Industry." Presented at the Washington State Bar Association's Thirteenth Annual Antitrust, Consumer Protection and Unfair Business Practices Conference, November 8, 1996.

"Differentiated Products: New Tools for New Methods." Presented at NERA's Seventeenth Annual Antitrust & Trade Regulation Seminar, Santa Fe, NM, July 5, 1996.

"Market Definition Under Price Discrimination" (with J. A. Hausman and G. K. Leonard), Antitrust Law Journal, Vol. 64, No. 2 (Winter 1996).

"Learning-by-Doing in the Context of Antitrust Analysis" (with J. Hausman), April 1995.

"An Economic Analysis of ATM Surcharging," prepared for Southeast Switch Inc., October 5, 1995.

"Cost Effects of Mergers and Deregulation in the U.S. Rail Industry" (with Berndt et al.), Productivity Issues in Services at the Micro Level, ed. Zvi Griliches and Jacques Mairesse, Kluwer Academic Publishers, 1993.

"Cost Effects of Mergers and Deregulation in the U.S. Rail Industry" (with Berndt et al.), Journal of Productivity Analysis, 4, 127-144, 1993.

"Rail Costs and Capital Adjustments in a Quasi-Regulated Environment" (with Friedlaender et al.), Journal of Transport Economics and Policy, 131-152, May 1993.

"Deregulation, Mergers and Cost Savings in Class I U.S. Railroads, 1974-1986" (with Berndt et al.), Journal of Economics and Management Strategy, Vol. 1, No. 2, 1992.

"Observations on Pre-Trial Bargaining Models," MIT Mimeo, September 1989.

“The Deregulation of the U.S. Rail Industry: Efficiency and Equity in Attaining Rail Viability,” Ph.D. Dissertation, Department of Economics, MIT, 1989.

“Achieving Cost Efficiency Through Merger: Evidence from the U.S. Rail Industry,” Presented at the American Economic Association Symposium on Mergers and Acquisitions, New York, December 29, 1988.

PREVIOUS COURT TESTIMONY (PAST FOUR YEARS):

Sulzer Intermedics, Inc. v. Medtronic, Inc., et al (U.S. District Court, Southern District of Texas, (C.A. H-97-3526)).

Joseph E. Seagram & Sons, Inc., The Seagram Company Ltd. and JDC S.A. de C.V. v. St Maarten Spirits, Ltd., and St. Maarten Spirits Limited (Superior Court of the State of California, for the County of Los Angeles, (No. BC 191 681)).

General Electric Capital Corporation v. DirecTV, Inc., Hughes Electronics Corporation and General Motors Corporation (U.S. District Court, District of Connecticut, 3:97 CV 01901 (PCD)).

Bristol Technology, Inc. v. Microsoft Corporation, (U.S. District Court, District of Connecticut, C.A. No. 398-CV-1657 (JCH)).

America Online, Inc. v. AT&T Corporation, (U.S. District Court, Eastern District of Virginia, C.A. No. 98-1821-A).

Forty-Niners Truck Plaza, Inc. v. Unocal Corporation, (Superior Court in and for the County of Sacramento, California, Case No. 531830).

Dade Behring Marburg Gmbh, Syva Company v. Biosite Diagnostics, Inc., (U.S. District Court, Southern District of New York, C.A. No. 97-501 MMS).

CBS Broadcasting Inc., et al., v. PrimeTime 24 Joint Venture, (U.S. District Court, Southern District of Florida, C.A. No. 96-3650-CIV-Nesbitt).

Becton Dickinson and Company v. Syntron Bioresearch, Inc. (U.S. District Court, Southern District of California, C.A. No. 97-CV-1634K (POR)).

Hard Rock Café International (USA), Inc., (f/k/a Rank Licensing, Inc.), v. Peter A. Morton and Hard Rock Hotel, Inc. (U.S. District Court, Southern District of New York, C.A. No. 97-CIV-9483 (RPP)).

Wang Laboratories, Inc. v. FileNet Corporation (U.S. District Court, District of Massachusetts, C.A. No. 94-12141).

Neles-Jamesbury, Inc. v. Fisher Controls International, Inc. and Fisher Service Company (U.S. District Court, District of Massachusetts, C.A. No. 94-40200).

The Toro Company v. White Consolidated Industries, Inc. and WCI Outdoor Products, Inc. (U.S. District Court, District of Minnesota, C.A. No. 4-95-656).

Polo Ralph Lauren, L.P. v. The Magnin Company, Inc. (American Arbitration Association Commercial Arbitration Tribunal, Case No. 74-181-1094-96).

Roll Systems, Inc. v. Wallace Computer Services Inc. (U.S. District Court, District of Massachusetts, C.A. No. 94-10372-MEL).

Black & Decker (U.S.), Inc. and Black & Decker, Inc. v. The Coleman Co., Inc. (U.S. District Court, Eastern District of Virginia, C.A. No. 96-656-A).

Century Wrecker Corporation v. Chevron, Inc. (U.S. District Court, Western District of Pennsylvania, C.A. No. 89-1452).

Federal Trade Commission v. New Balance Athletic Shoe, Inc. (Boston, Massachusetts, File No. D9268).

Minnesota Mining and Manufacturing Co. v. Avery Dennison Corp. (U.S. District Court, District of Minnesota, C.A. No. 4-93-1070).

Becton Dickinson and Co. and Becton Dickinson Vascular Access Inc. v. Critikon Inc. (American Arbitration Association, Arbitration No. 13 133 00388 93).

Minnesota Mining and Manufacturing Co. v. Norton v. Bay State Abrasives Co. (U.S. District Court, District of Delaware, C.A. No. 89-533 (JJF)).

AFFIDAVITS

Expert Report in connection with *Omniglow Corporation v. Unique Industries, Inc.* (U.S. District Court, District of Massachusetts, (C.A.No. 99-30052-MAP)), November 1999.

Expert Report in connection with *Joseph E. Seagram & Sons, Inc., The Seagram Company Ltd. and JDC S.A. de C.V. v. St Maarten Spirits, Ltd., and St. Maarten Spirits Limited* (Superior Court of the State of California, for the County of Los Angeles, (No. BC 191 681)), August 1999.

Expert Report in connection with *General Electric Capital Corporation v. DirecTV, Inc., Hughes Electronics Corporation and General Motors Corporation* (U.S. District Court, District of Connecticut, 3:97 CV 01901 (PCD)), August 1999.

Expert Report in connection with *America Online, Inc. v. AT&T Corporation* (U.S. District Court, Eastern District of Virginia, C.A. 98-1821-A), March 1999.

Expert Report in connection with *Ashraf M. Dahod v. Bay Networks, Inc. and LanCity Corporation, Inc.* (U.S. District Court, District of Massachusetts, C.A. No. 96-11907 REK), September 1998.

Expert Report in connection with *Harris Corporation, et. al v. Atmel Corporation*, (U.S. District Court, Eastern District of Virginia, C.A. No. 98-98-A), June 1998.

Expert Report in connection with *Critikon, Inc. v. Becton Dickinson Vascular Access, Inc.*, (U.S. District Court, District of Delaware, C.A. No. 93-108 (JJF)), June 1998.

Expert Report in connection with *CBS Broadcasting Inc., et al., v. PrimeTime 24 Joint Venture*, (U.S. District Court, Southern District of Florida, C.A. No. 96-3650-CIV-Nesbitt), May 1998.

Expert Report in connection with *Becton Dickinson and Company v. Syntron BioResearch, Inc.* (U.S. District Court, Southern District of California, C.A. No. 97-CV-1634K), May 1998.

Expert Report in connection with *Luigino's, Inc. v. Pezrow Company, Inc. and Pezrow Company of New Jersey, Inc.* (U.S. District Court, District of Minnesota Fifth Division, C.A. No. 5-96-244), October 1997.

Supplemental Expert Report in connection with *Neles-Jamesbury, Inc. v. Fisher Controls International, Inc. and Fisher Service Company* (U.S. District Court, District of Massachusetts, C.A. No. 94-40200), October 1997.

Expert Report in connection with *Neles-Jamesbury, Inc. v. Fisher Controls International, Inc. and Fisher Service Company* (U.S. District Court, District of Massachusetts, C.A. No. 94-40200), August 1997.

Expert Report in connection with *The Toro Company v. White Consolidated Industries, Inc. et al.* (U.S. District Court, District of Minnesota, C.A. No. 4-95-656), May 1997.

Supplemental Expert Report in connection with *Century Wrecker Corporation v. Chevron, Inc.* (U.S. District Court, Western District of Pennsylvania, C.A. No. 89-1452), May 1997.

Supplemental Rebuttal Expert Report in connection with *Polo Ralph Lauren, L.P.. v. The Magnin Company, Inc.* (American Arbitration Association Commercial Arbitration Tribunal, C.A. No. 74-181-1094-96), May 1997.

Rebuttal Expert Report in connection with *Polo Ralph Lauren, L.P.. v. The Magnin Company, Inc.* (American Arbitration Association Commercial Arbitration Tribunal, C.A. No. 74-181-1094-96), May 1997.

Expert Report in connection with *Wang Laboratories, Inc. v. FileNet Corporation.* (U.S. District Court, District of Massachusetts, C.A. No. 94-12141 RLC), April 1997.

Affidavit in Support of Ag-Chem Equipment Co. Inc. and Soil Teq, Inc.'s Motion For Summary Judgment. (U.S. District Court, District of Minnesota, C.A. No. 4-93-1228), August 1996.

Expert Report and Supplemental Expert Report in connection with *Roll Systems, Inc. v. Wallace Computer Services Inc.* (U.S. District Court, District of Massachusetts, C.A. No. 94-10372-MEL,), July 1996 and December 1996.

Expert Report in connection with *Dynamic Manufacturing Inc. et al. v. Chevron Inc.* (U.S. District Court, Eastern District of Virginia, C.A. No. 2:95CV947), April 1996.

Expert Report in connection with *Century Wrecker Corp. v. Chevron Inc.* (U.S. District Court, Western District of Pennsylvania, C.A. No. 89-1452), March 1996.

Expert Report in connection with *Medtronic v. Pacesetter and St. Jude Medical Inc.* (American Arbitration Association), February 1996.

Expert Report in connection with *Cedar Ridge Trailer Sales et al. v. National Community Bank of New Jersey et al.* (Superior Court of New Jersey , C.A. No. BER-L-09277-92), December 1995.

Expert Report in connection with *Federal Trade Commission v. New Balance Athletic Shoe, Inc.* (Boston, Massachusetts, File No. D9268), 1995.

Expert Report in connection with *Minnesota Mining and Manufacturing Co. v. Avery Dennison Corp.* (U.S. District Court, District of Minnesota, C.A. No. 4-93-1070), 1995.

Expert Report in connection with *Minnesota Mining and Manufacturing Co. v. Norton v. Bay State Abrasives Co.* (U.S. District Court, District of Delaware, C.A. No. 89-533 (JJF)), 1994.

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INDUSTRY EXPERIENCE:

- Textiles
- Over-the-Counter Drugs
- Toiletries
- Lighting Products
- Paper
- Retail Stores
- Software & Operating Systems
- Banking/EFT Networks (ATM/POS networks, Thrifts; Transfer Services)
- Cable Television Services
- Glassware
- Seafood
- Produce
- Breakfast Cereals
- Footwear
- Diapers
- Cigarettes
- Car Wax
- Personal Computers
- Contact Lens Care Products
- Prescription Drugs
- Spinal Implants
- Angioplasty Catheters
- Intravascular Ultrasound
- Infusion Pumps
- Pacemakers and Defibrillators
- Prescription Benefits Services
- PTCA Catheters
- Fiberglass Casting Products
- Catheter Dressings, Catheters
- Hemodialysis Catheters (Mahurkar)
- Home Pregnancy Testing Kits and Related Technologies
- Magnetic Resonance Imaging (MRI) Devices and Contrast Agents
- Diabetes Testing Devices
- Legal/Financial Publications and CD ROM Titles
- Domestic and Commercial Circuit Breakers
- Heating, Ventilation, and Air Conditioning (HVAC) Systems
- Check Verification Services; Credit Card Processing Services, EFT Product Services
- Industrial Cleaning Products and Services
- Printing
- Paperboard
- Aluminas and Related Compounds
- Manmade Fibers (Nylon and Polyester)
- Fertilizer
- Cable Services and Programming; Entertainment; Sports Programming
- Printed Circuit Board Assembly Equipment
- Food Metal Cans
- Flight Simulators
- Airlines
- Airline Computer Reservation Systems
- Microprocessors/DRAMs/EPROMs
- Fertilizer Equipment
- Wholesale Financing Services – Motor Homes
- Natural Gas
- Photocopiers

- Telecommunications Equipment and Services
- Precision Weighing and Measuring Instruments
- Single Inline Memory Modules (SIMMS)
- Metal Can Interior Coatings
- Gypsum Board
- Industrial Grinding Products
- Flexographic Printing Plates
- Facsimile Machines
- Chemiluminescent Technologies
- Photography Products
- Automotive Products
- Industrial Diamonds
- Cosmetics
- Dental Implants
- Waste Disposal and Collection Services
- Liquor
- Salt
- Sugar
- Cable and Satellite Television Products and Services
- Network Systems
- Railroad Equipment and Services
- Commercial Laboratory Services
- Educational Publishing
- Exploration Oil and Production Services
- Car Carriers and Wreckers
- Cellular Telephones
- Flashlights
- High Speed Printing and Processing Equipment
- Data Collection and Related Applications Technologies
- Toys
- Retail Garments and Accessories
- Industrial Valves
- Lawn and Garden Equipment
- Continuous Blood Pressure Monitoring Devices

January 2000

Exhibit 2: Imports into U.S. from Countries Outside of North America

	1992	1999	% Change 1992-1999
	<i>Customs Value</i>		<i>Percent</i>
CHEMICALS & ALLIED PRODUCTS	20,537,986,119	49,302,714,591	140%
NONMETALLIC MINERALS, EXCEPT FUELS	295,771,102	1,017,692,639	244%
PAPER & ALLIED PRODUCTS	2,475,829,048	5,040,394,358	103%
LUMBER & WOOD PRODUCTS, EXCEPT FURNITURE	1,926,871,625	4,363,773,157	126%
PRIMARY METAL PRODUCTS	13,135,235,348	25,408,888,720	93%
METALLIC ORES & CONCENTRATES	834,648,514	897,697,441	8%
BITUMINOUS COAL & LIGNITE	94,463,932	241,894,313	156%
STONE, CLAY, GLASS, & CONCRETE PRODUCTS	4,596,534,584	9,216,210,271	101%
SCRAP & WASTE	354,838,295	716,906,303	102%
CASH GRAINS AND OTHER CROPS	116,794,379	224,914,589	93%
PULP MILL PRODUCTS	332,656,679	443,648,432	33%
MOTOR VEHICLES AND MOTOR VEHICLE EQUIPMENT AND PARTS, NSPF	42,774,009,196	72,722,292,301	70%
FOOD AND KINDRED	12,614,124,981	17,597,709,761	40%

Source: <http://dataweb.usitc.gov>.